ATTACHEMENT # 1

GENERAL DESCRIPTION OF THE PROJECT

The project consists of the construction of 12 kennel units, 3 support spaces and exterior works as follows:

- Twelve (12) Kennel units. All the respective electrical, hydraulic installations and finishes are to be included.
- One (1) space with complete bathroom to be used as a sleeping room for the personnel. All the respective electrical, hydraulic installations, finishes and sanitary devices (sink, shower and sanitary) are to be included.
- One (1) electrical cabinet. All the respective electrical installations and finishes are to be included.
- One (1) store room with concrete shelves. All the respective electrical installations and finishes are to be included.
- Exterior works that include grading, filling material, turfing, utilities systems, connections sidewalks and fences.
- The price of this work shall include materials, tools and labor, along with all necessary operating costs, such as personnel transportation, meals and lodging for personnel. See description, location, specifications and designs in the following paragraphs and the attached plans.

GENERAL SPECIFICATIONS FOR THE PROJECT

This project shall consist of the construction of 12 kennel modules in structural masonry for the Colombian National Police (CNP) Facilities at Tumaco, Department of Nariño to support the Manual Eradication Program. The construction shall include the use of quality materials that are capable of withstanding tropical rainy climate.

The price of the buildings to be constructed shall also include concrete foundation, structural masonry, roof and floor, electrical, hydraulic and sanitary facilities and installations, and doors, locks, sanitary fittings, and finishes as indicated. The building shall comply with the current standards of the Colombian Seismic Resistance Code (NSR Standard, 10).

The contractor shall be responsible for transportation, meals and lodging of the construction team on the work site (away from the project site), or as arranged with the CNP personnel. The contractor shall have a representative at the work site to receive materials, which shall be responsible for unloading materials and transporting it to the actual work site.

The building shall be erected at least 60 cm above the existing natural terrain and/or 10cm the existing road level and if required, the respective steps being at each access point.

The place where the buildings shall be located at the proposed location is shown on drawing No.A-1. Designs and dimensions are likewise shown on the attached drawings.

1. PRELIMINARY WORK

1.1 TEMPORARY FACILITIES

1.1.1 Camp Site:

The contractor shall build a temporary work camp in galvanized metal plates or containers to be used as a site office and storage area for construction elements, including dressing rooms for the personnel at the worksite, equipped with everything to meet personal hygiene, comfort, and ventilation requirements and protection against weather conditions.

The location of this work camp shall be coordinated among the contractor, the CNP and the Contracting Officer's Representative. The contractor shall be responsible for the elements left in this location and shall remove the work camp when the works are finished, leaving the area in the same condition in which it was delivered.

1.1.2 Temporary enclosure:

The contractor shall isolate the project area from the zones or roads that surround the terrain or the work area. Also, if a material storage area is built, it shall also be enclosed. To do so, the contractor shall install a polypropylene enclosure (Height = 2.1 m) using appropriately driven wooden posts every 2 m and pulled firm with wire on the top, in the middle. The contractor shall also install bottom supports on each side of the access door and on the swinging joints. The enclosure shall only have one dual gate access for the access of machinery, vehicles, and personnel. During the performance of the works, the contractor shall take care of the maintenance and repair of the enclosure, in such a manner as to always keep it in optimum conditions.

1.2 LOCATION AND LAYOUT:

The contractor shall perform a survey of the project area using precision topography instruments, based on the design supplied. The contractor shall double-check the measures of the area assigned. This shall be done by a certified professional who, in addition to the layout, shall establish the project levels. Everything shall be referenced using strongly fastened wooden headers. The contractor shall supply all of the materials to build the planimetry references, the level references, such as stakes and field logs, etc.

The Contracting Officer's Representative shall review the location of the axes, but this does not waive the contractor of its responsibility, in the event of an error in locating or leveling, in any portion of the works. Before beginning with the locating and layout, the contractor shall confirm the points of reference or ties required with the CNP facilities section which shall be defined and approved, as well as the borders of the terrain to occupy.

The temporary Bench Marks (BM) and references axes shall be located in spots that do not interfere with the performance of the works, where it shall not be necessary to remove them, in order to enable later control at any given time during the works. After doing the locating and layout out of the construction, the contractor shall submit a drawing including the location of the access road structures and the nearest structures existing trees and shrubs, for approval.

The contractor shall include the location and layout out of all the work necessary to complete the project, as well as submission of the drawings. The reference levels are shown on drawing **S-2.** The area for the kennels is 79sqm. The total area, including exterior works is 179sqm.

1.3 EXISTING FACILITIES DEMOLITION:

The Contractor shall demolish and remove the existing kennel structure located in the area where the new construction shall be built.

The contractor shall be responsible for damage caused by the debris while they are being withdrawn. The works include demolition tools and transportation in trucks to authorized sites.

1.4 EXCAVATION:

The contractor shall perform the clearing, grubbing, excavation and removal needed to carry out all works regarding this contract. The Contractor shall be responsible for any damage to the site during the execution of these activities. The excavation works shall include minor tools, machinery, dump truck transportation to authorized sites in the region, and labor.

At the excavation sites and access points, the Contractor shall provide all safety signs, warning signs and temporary enclosure required. The work zone shall be enclosed using 8-cm wide yellow plastic safety tape strips nailed to and / or supported on the floor, and shall at least have three strips to protect persons, vehicles and animals from possible accidents.

The Contractor shall be prepared to excavate any type of material, using the appropriate methods, equipment and tools. Before initiating the excavation work, the Contractor shall perform an aerial, surface and / or underground survey of any potential interference accompanied by an authorized CNP representative, in order to prevent from damaging pipes, cables, posts, hoses, wells or other elements or structures that exist in the excavation area and / or in the access points. In the case of excavation and / or removal interfere with sewage systems, piping, cables or other elements, the Contractor shall proceed to support or protect them appropriately. The Contractor shall keep all plugs, covers and sumps in the public utility systems located near the excavation sites free from waste, in order to avoid their obstruction or damage.

Any excess excavation resulting from landslips, the trench bed being broken hydraulically, deficient shoring or inadequate penetration when this is due to negligence on the part of the contractor will be remedied at the cost and expense of this latter. The contractor should fill in any such excess excavation using granular material that has first been approved by the contracting party and the soils engineer until the necessary excavation cross section for the work has been achieved, and replace props or the shoring system to the satisfaction of the Embassy. The costs of any such excess excavation and consequent filling, including materials, will be borne by the contractor.
Surplus material from the excavation and clearing work will be removed by the contractor as indicated by the Embassy representative.

Excavations more than one metre high will be shored up in order to prevent the material from slipping and causing damage to the work or adjacent constructions, and to provide safe working conditions. If the contracting party considers that the shoring is insufficient, it may order the number of props to be increased; this does not exempt the contractor from its responsibility for any landslips which might occur or for damage caused by these.

The Contractor shall be responsible for the stability of all temporary slopes. The Contractor shall also be responsible for handling surface water and for evacuating underground water or any other type of water, and for supplying and maintaining the drainage and pumping systems required to stabilize slopes and to avoid water from entering the excavations.

The excavation shall comply to the levels of the structural drawings.

1.5 SUBGRADE COMPACTING

The Contractors shall compact all subgrade areas resulting from the excavation work before beginning the filling activities, using a self-powered equipment and/or manual equipment in narrow areas, until a density is obtained which is equivalent to a change in its original shape of not more than 2 mm between simultaneous runs with the compacting equipment (in the case of self-powered equipment) and until such time as the footprints of a person weighing more than 75 kg shall not show in compacting areas.

The compacting equipment chosen by the Contractor shall be approved by the Contracting Officer's Representative, and shall be in line with the plasticity features of the material that is to be compacted. If any unsatisfactory material or soft points appear in the subgrade during the compacting process, the Contractor shall

replace it promptly by means of excavations followed by filling with the satisfactory materials, unless the fault is due, in the opinion of the Contracting Officer's Representative, to over-compacting and/or incorrect use of the compacting equipment, in which case the material shall be replaced at the expense of the Contractor.

1.6 SUPPLY AND INSTALLATION OF GEOTEXTILE NT 2000: The contractor shall supply and install a geotextile layer non woven of long fiber of polypropylene with density major or equal to 160 gr/m2, type Pavco NT-2000 or equivalent approved. The minimal overlaps shall be 0,60 m except if the stripes are stitched in which case it shall come down to only 0,30 m The non woven geotextile shall cover the whole opening of the excavation, rising for the rims of the excavated booth, and bend 2 m above the filling material in all directions.

1.7 FILLING MATERIAL:
The contractor shall supply all labor, materials, equipment, and execution of all works required for the filling involved in this activity. The filling materials thickness shall change according to the foundation area for each portion of works.

Before starting the filling work, the Contractor shall verify that the terrain to be used as a base shall lack completely of vegetation, organic soil, and construction debris and the surfaces shall not have any flooded areas or areas with stagnant water. The Contractor shall confirm that the subgrade is compacted before applying the layer of filling material.

The Contractor shall select the sources for the filling materials. The contractor shall submit the material source for consideration of the US Government and shall present representative samples and the results of laboratory tests, at least seven (7) days before the Contractor intends to initiate the filling work. Supplying the samples and performing the tests by the Contractor shall not result in any additional price to the US Government.

The Contractor shall use for the filling gravel materials that shall not contain any organic silt, plant matter, garbage, solid waste materials or debris. The maximum size of the materials shall be five (5) centimeters. The fine contents (the percentage that passes through a #200 sieve) shall be less than twenty percent (20%), and the material plasticity index that passes through a #40 sieve shall be less than 8%. The materials for filling shall be compacted in successive symmetrical layers of minimum ten (10) centimeters and maximum fifteen (15) cm at a compaction of 95% of the modified proctor. The compacting methods and equipment to be use shall be approved by the Contracting Officer's Representative.

2. CONCRETE STRUCTURES:
The concrete structure, metallic structure and other constructions shall be built and installed according to the standards contained in the NSR-10 code.

The Contractor shall include the execution of the corresponding laboratory tests as required. The Contractor shall take 6 sample cylinders for concrete resistance tests per pouring or per each 5 m3 of concrete, in order to test 2 cylinders at 7 days, 2 cylinders at 28 days and leave 2 cylinders as proof samples. The results of the laboratory tests shall be submitted for approval of the Contracting Officer's Representative.

2.2 Vapor Barrier:
After the filling material has been completed, the Contractor shall supply and install a vapour barrier ('Polisec' or similar) along the whole filling area, and an extra width of 0.40 shall go above the walls of excavation. The interior overlap joints should be at least 15 cm wide, and shall be fixed or sealed in place using adhesive tape or similar at least 5 cm wide and compatible with the membrane. The vapour barrier shall be made of polyethylene at least 0.152 mm (6 mils.) thick or equivalent material (same characteristics and features). The contractor shall submit for approval a representative sample and technical details of the product to be installed.

2.3 Concrete slab for building and sidewalk T = 10 Cm:
The Contractor shall build a 0.10 m thick concrete slab, with a strength of 21 Mpa (3000 psi) including equipment, forming, placing, levelling and smooth finished; the Contractor shall repair any difference of more than 3mm above or below the level in this specification (by finishing or passing a polishing machine), and such costs shall be assumed by the Contractor. The slab shall have an electro-welded mesh with 7.5 mm rebar, with spaces every 15 cm on both sides, and the mesh shall be located in upper third of the concrete slab. The slab shall have control joints every: 2.10 meters by length and 2.14 meters by width. Also it shall have a slope of 2% towards the exterior. The concrete finishing for the sidewalk shall be a wood plane finish. The Contractor shall fill all the joints with joint sealant material "Sika" or similar. The dimensions are indicated on the attached drawing.

2.4 Concrete foundation jointing beam 21 Mpa (3000 psi): Dimensions 0.30x0.40 m:
The Contractor shall perform the construction (Equipment, setting up, placing, levelling and smooth finished) of a 0.30 x 0.40 m concrete beam, with strength of 21 Mpa (3000 psi); the Contractor shall supply and install the rebar for this beam as is indicated in the attached structural drawings.

2.5 Cyclopean concrete foundation:
The Contractor shall perform the constructing of a cyclopean concrete foundation, complying with the positions and dimensions stated on the approved structural drawings for the project, and shall include the supply of all materials, labour, facilities and equipment that shall be required. The contractor shall supply and install all formwork which shall be necessary for restraining and shaping the concrete, and shall lay all reinforcement steel that shall be needed, in accordance with the approved structural design. The Contractor shall use a proportion of 40% of rock within 15-20 cm average size and 60% of concrete with a resistance of at least 21 Mpa (3000 psi). The entire construction process shall comply with NSR-10 requirements or current standard, specifically Chapters C.1 - General Requirements, C.3 - Materials, C.4 - Durability Requirements, C.5 - Concrete Quality, Mix and Laying, C.6 - Straightedges, Embedded Pipework and Construction Joints, and C.7 - Reinforcement Details, all in accordance with Chapter C.2 - Definitions

2.6 Upper beam and roof beam:
The contractor shall perform the construction (Equipment, setting up, placing, levelling and smooth finish) of 0.15 m x 0.20 m concrete upper beam, with a strength of 21 Mpa (3000 psi). The rebar for these beams shall be installed as is indicated in the attached structural drawing. The concrete will remain visible, and the dimensions and features will be as shown on the plans.

2.7 Reinforcement
The reinforcement that the Contractor shall use (420 Mpa.) on the different concrete structures shall be as specified for this type of structure in the NSR-10 or current standard. In the case of the electro-welded mesh, the Contractor shall include it in the price of the respective item required, based on the design and recommendations by the manufacturer.

2.9 Concrete Counter/Shelves. This item includes building of concrete slabs in 2500 psi
concrete 0.075m. thick: 3 shelves for the store room, equally distributed /height and one (1) in the nursery. This item includes a polished granite finish for the nursery worktop and a wood plane finish for the storeroom shelves.

2.10 Concrete Pedestal. This work includes building concrete pedestals on which eating bowls will be fitted in each of the kennels. Dimensions: 0.65m wide, 0.45m deep, and 0.125m/0.25m high (see Drawing A-2). Each pedestal will have two circular spaces Ø 0.20m., 0.065m. deep, to hold the metal bowls. This item includes the concrete pedestal and painting in 'Sikaguard 62'. The contractor must verify the metal bowls size previous to the concrete casting.

2.11 Half-Round Molding. This item must be included in all the interior spaces (kennels and others): half-round molding floor-wall joints up to a height and base of 10 cm. in 1:3 waterproof mortar.

4. ROOF

The Contractor shall supply only qualified personnel for the manufacturing and welding of the main metallic elements, and only appropriate tools shall be used, with previous authorization.

In the event that any material or manufactured element is defective, due to bad quality raw material or inappropriate installation or due to any other reason, not meeting with the specifications and/or designs, the Contractor shall correct this without additional cost to the US Government. The Contractor shall change or correct all materials or elements that have been rejected or that require correction

4.1.Roof Structure.
The roof structure for the building should be designed and built as shown on the drawings, and NSR-10 standard should be adhered to. The structure should be in steel profiles and designed according to the calculations. The structure will be designed to support the roof as well as the solar panels. The part of the structure that remains visible should be painted with anti-corrosive paint coating 3mils thick and 2 layers of 6 mils coating paint, suitable for highly aggressive atmospheric conditions (marine type paint or similar).
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The Contractor shall properly finish the structural elements that are visible and shall use C-studs.

The Contractor shall use thin hot rolled sheets ASTM A-1011 Grade 50 with values of Fy=35.15 Kg/mm², Fu=45.70 Kg/mm² and a minimum elongation of 20% for the metallic sections of the straps and the beams of the building and shall meet the requirements demanded for materials allowed for this used and specified in the NSR-10 norm or current standard.
Unless otherwise specified, the Contractor shall perform all work in accordance with applicable part of the most recent editions of the norms indicated below, complemented with particular specifications of the contract and the ones indicted in design.

- Seismic resistant constructions Norms NSR-10 title F or current standard.
- A.I.S.C. - "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings"; ASD/LRFD. A.W.S. "American Welding Society Specifications".
- A.S.T.M "American Society for Testing and Materials".
- S.S.P.C. "Steel Structures Painting Council".
- ICONTEC Normas 1920, 1950, 1971 y 1985.
- ANSI “American National Standard Institute”

This item includes the complete structures for the building, consisting of beams, belts, diagonals, bracing, guys, etc., plus the iron fittings and accessories needed for erection and installation. Before the structure is manufactured, the contractor should submit calculation reports, construction plans, a full description of the whole erection system, and catalogues for paint, screws, welding, steel quality etc. to the contracting party for approval.

4.2. Architectural Tiled Roof

The double-sloped roof will be fitted in accordance with the manufacturer’s recommendations, to cover the front part of the kennel, and should guarantee correct functioning on rainy days, with no leaks or moisture on walls.

The Contractor shall supply and install a roof panel sandwich type cover with polyurethane, type or equivalent for the roof, with a minimum thickness of 1". The Contractor shall make both surfaces of galvanized sheets with a minimum thickness of 0.7/0.5 and factory-painted for a ten-year guarantee. The Contractor shall include roof paneling system as shown on the drawings.

The Contractor shall take into account an independent mechanical system for fixing the joint and an excellent finish for all connections, erections and joints. The Contractor shall include all joints and supporting items from the manufacturer.

In the interior of the modules, the Contractor shall have a good aesthetic finish for the roof and the roof shall have an overhang of at least 0.80 m along the four sides (See architectural drawings). The color of interior and exterior finishing of the roof shall be submitted by the Contractor for the approval of the CNP and the Contracting Officer's Representative.

4.3. Ridge

The contractor shall supply and install a ridge along the roof (See architectural drawing A-1). The ridge shall be smooth with cap to seal the ridge and capable of withstanding tropical rainy climate.

4.4. 3" Rainwater PVC Downpipes and Gutters.

This item includes the supply and installation of 3" PVC downpipes and gutters, with the respective accessories (see architectural drawing A-2). The manufacturer's recommendations relating to mounting, pipework and accessories must be followed during installation.

5. MASONRY

5.1 Masonry in concrete blocks:

The Contractor shall build perimeter and internal walls from floor to the height as shown on drawings (See structural and architectural drawings). The Contractor shall build these walls on 0.39 x 0.15x 0.19 m concrete block (CMU) type at least 0,15 m wide.

The Contractor shall make the walls of top quality materials stated under each item. Block dimensions shall be homogeneous, with edges well finished and even surfaces (in the case of smooth blocks). The Contractor shall use mechanical cutting of parts. Joints shall not be thicker than 1.2 cm or smaller than 0.7 cm. Where visible masonry, joints shall be fluted (1 cm deep).

The Contractor shall take into account that the vertical deviation in a wall two fifty meters high or less shall be not more than 2.5 mm. The Contractor shall use mortar in the proportion of 1:3 for joining the CMU. The Contractor shall paint all masonry facades and interior walls, using exterior paint Pintuco 'Koraza' or equivalent. Color to be defined by the CNP and Contracting Officer's Representative.

The contractor should review the design structural masonry that fulfils the requirements stated in NSR-10 for this type of structure and but to make the modifications necessary so that it fulfills.

The Contractor shall include all joints and structural items**. Block samples shall be submitted for approval before purchasing and installation.**

6. FLOOR AND WALL FINISHES

6.1 Wall tile:

The Contractor shall install ceramic wall tile, of 0.30 x 0.30 m ceramic tiles EGEO type or equivalent in the bathroom at a height of 2.0 m and in the nursery at the upper part of the examination counter. The Contractor shall include waterproof plaster in the price of the tile activity, as well as suitable material for bonding the wall tiles, joint sealer, plastic molding (wines), etc. Samples shall be submitted for approval before purchasing and installation.

6.2 Floor tiles:

The Contractor shall install floor tiles inside the bathroom area, sleeping room and, nursery. A 0.34 x 0.34 m ceramic tile type Corona -DUROPISO or equivalent, non-slippery, commercial traffic 5, with the corresponding ceramic tile skirting. The Contractor shall include floor-tile bonding material and joint sealing material. Samples shall be submitted for approval before purchasing and installation.

6.3 Waterproof Plaster for Inside Walls and Floors.

This work includes 1:3 plaster with integral 'Sika 1' or similar waterproofing. It includes linear metres, edges and expansion joints, and half-rounded floor-wall moulding. To be applied on:

- All the interior walls from floor to end of wall height. Plaster thickness: 1.5cm
- The floors of each kennel with a 2% slope towards the exterior as shown on drawings. Minimum thickness 1.5cm

6.4 'Pintuco' Koraza Pro 750 or equivalent

To be applied on the outside and inside walls from floor to ceiling height of the storeroom, electrical cabinet, nursery and sleeping room. For the kennels: from 1.00m from the floor to ceiling height. The manufacturer's instructions should be followed when this paint is being applied. The joint between one type of paint and another or between one colour and another should be in the form of a perfectly straight line.

6.5 'Sikaguard 62' CO Paint or equivalent

Grey 'Sikaguard 62' CO to be applied on the floors of the kennels, the electrical and storeroom spaces and all the interior walls up to 1.00m height as per indicated in drawings. The manufacturer's instructions should be followed when this paint is being applied, and the floor should be given a soft texture so that the animals' feet do not get hurt.

6.6 Anti-Humidity Paint for Frontage.

The contractor should supply a water repellent for frontages such as TRANSPARENT 'SIKA' 7W CO or equivalent and apply this to all outside walls according to the manufacturer's recommendations, . The cost includes edges and expansion joints.

6.7 Anti-Corrosive and Gloss Paint on Metalic, Platens, Angles and Metalic Accesories

The contractor should apply anti-corrosive paint and two coats of gloss paint, 'Pintuco' or equivalent. Colours approved by the contracting party, to all metal items like door and window frames, meshes, etc. The cost of this activity will be included in each metalwork item, and no separate payment will be made unless otherwise stated.

6.8 Plaster proportion 1:4 Thickness 1.5 cm including edges and expansions joints.

The Contractor shall execute all of the openings for the electrical and hydro-sanitary, installations before applying the plaster for the walls and also these systems shall be duly tested. Additionally, the Contractor shall clean the walls and verify that there are free of grease or mortar remaining from the execution of the masonry, as well as properly moisturized in order to receive the plaster. For straight walls the Contractor shall execute vertical master guides with a maximum separation of 2.00 m between each guide, in order to obtain perfectly straight and

adjusted mortar. After the initial setting of the master guides, the Contractor shall apply the water proof mortar against the wall using a trowel and leveling with aluminum straightedges supported on the master guides.
Once the setting of the mortar has started, the Contractor shall smooth the plaster using a wooden trowel and a mixture from the same plaster in order to fill cracks or porosities. Maximum average thickness for the plaster shall be 1.5 cm. The Contractor shall verify that the finished surface have a perfect plumb line and shall be completely smooth.

7. ELECTRICAL INSTALLATIONS

Electrical Standard Scope

Any electrical installation, which shall be done by the Contractor, shall comply with the following electrical standards: NTC 2050 last upgraded version included but not limited to chapters 1,2,3,4 and section 645,NEC 250 last version upgrade, NTC 3471/UL 67, EIA/TIA 607, EIA/TIA 568-569 last version upgraded, ANSI/IEEE C62.41-C62.45, NEPA 780, NTC 4552, IEEE-80, IEEE-77 and RETIE last version upgraded. The Contractor shall include in his proposal catalogs and technical sheets of materials, parts and elements to be used in the project. The awarded Contractor shall use a qualified Electrical/Electronics Engineer, who shall manage and control the execution of the electrical and communication work. The proposed Electrical/Electronics Engineer shall also sign the installation conformity and material conformity acts requested on RETIE. The Contractors shall include in his proposal the curriculum vitae of the proposed engineer.

7.1 Main circuit branch

The Contractor shall supply and install a new main circuit branch, running form the solar power system to the main panel board. The cabling installation shall be done according to indications done on drawings. The Contractor shall supply and install a set of industrial breakers, thermo-magnetic trigger with a current protection capacity as per the drawings, which shall be installed in the new distribution panel board to be supplied and installed by the awarded vendor. The new current breaker shall be new brand such as Merlin Gerin, ABB, Siemens or equivalent and shall be RETIE certified. The main circuit branch shall be labeled according to this technical paper (please see marking chapter for more details).

7.2 Solar Power System

The contractor shall supply and install a solar power system , that includes all the parts as shown in the drawings and the necessary seismic bracing for anchoring all Panels and equipment.

7.2.1 Submittals Submit the following information for the solar panel system:

- Shop Drawings: Of complete system depicting integration, protections and calculations.
- Product data: for each part of the system to include but not limited to: Solar Panels, Inverter, Batteries, DC panels and protections.
- Design Data: includes calculations of load, discharge time etc, the design of the system shall be approved by the COR.
- Certification: Submit Letter of Certification from system provider indicating that energy produced by the system represents minimum 1 of the total energy demand for the building.

7.2.2 Applicable Standards:

a. Weathering:

ASTM E1038-Standard Test Method for Determining Resistance of Photovoltaic Modules to Hail by Impact with Propelled Ice Balls

ASTM E1171- Standard Test Method for Photovoltaic Modules in Cyclic Temperature and Humidity Environments

ASTM E1597- Standard Test Method for Saltwater Pressure Immersion and Temperature Testing of Photovoltaic Modules for Marine Environments

ASTM E1802-Standard Test Methods for Wet Insulation Integrity Testing of Photovoltaic Modules

ASTM E2047- Standard Test Method for Wet Insulation Integrity Testing of Photovoltaic Arrays
ASTM E1830- Standard Test Methods for Determining Mechanical Integrity of Photovoltaic Modules
ASTM E781- Standard Practice for Evaluating Absorptive Solar Receiver Materials When Exposed to Conditions Simulating Stagnation in Solar Collectors With Cover Plates
ASTM E782- Standard Practice for Exposure of Cover Materials for Solar Collectors to Natural Weathering Under Conditions Simulating Operational Mode
ASTM E823- Standard Practice for Nonoperational Exposure and Inspection of a Solar Collector
ASTM E881- Standard Practice for Exposure of Solar Collector Cover Materials to Natural Weathering Under Conditions Simulating Stagnation Mode

b. Calibration:
ASTM E1362- Standard Test Method for Calibration of Non-Concentrator Photovoltaic Secondary Reference Cells

c. Energy Performance:
ASTM E948- Standard Test Method for Electrical Performance of Photovoltaic Cells Using Reference Cells Under Simulated Sunlight
ASTM E1021- Standard Test Methods for Measuring Spectral Response of Photovoltaic Cells
ASTM E1040- Standard Specification for Physical Characteristics of Nonconcentrator Terrestrial Photovoltaic Reference Cells
ASTM E1462- Standard Test Methods for Insulation Integrity and Ground Path Continuity of Photovoltaic Modules

7.2.3. Quality Assurance

The contractor shall provide a complete working system, it is up to the contractor to include all the necessary equipment, cabling and accessories for a fully operational system and the integration of the necessary subparts. The contractor shall provide a calculation of the system and integration of the equipment including a revision of the energy consumed by the building, grounding of the system, overcurrent DC and a AC protection and the sizing of the components of the solar power system for a complete working system as well as verification of measurements and available spaces.

7.2.4. Qualifications

The contractor or one of its subcontractors shall have experience of at least 3 years in the design, installation and maintance of solar power systems for similar buildings.

7.2.5 Warranty

Provide a 5 year Warranty for the complete installation of the system and a 2 year warranty for each of its components.

7.2.6 System Description

The system will be the only power source for the building and will provide 100% of the energy needs as per the requirements included in the drawings.

7.2.7 Design Requirements

The system shall be designed as a whole by the contractor taking into account the specific site conditions and requirements of the building, the design shall be submitted to the government for approval and shall include a complete list of materials and equipment to be used as well as detailed calculations and a single line diagram as well as shop drawings depicting location of equipment and sizing of the components.

7.2.8 Performance Requirements

The system shall comply with LEED and ASTM standards for Solar Energy products and systems. The contractor shall design and recommend a grounding scheme for the solar power system including AC and DC portions of the system.

7.2.9 Equipment

7.2.9.1 Photo Voltaic Cells

Provide High Efficiency Photo Voltaic Cells, including all the necessary accessories for mounting and connection.

7.2.9.2 Combiner Box

Provide a DC combiner box complying with UL and NFPA standards to integrate the solar array, including all breakers, fuses and accessories.

7.2.9.3 Charge Controller

Provide a charge controller with integrated lightning arrester

7.2.9.4 Batteries

Provide deep cycle batteries at least 4920 Watts per hour Capacity. With Shunt and all related protection accessories

7.2.9.5 Inverter

Provide an Inverter to provide AC power at 120/208V 60hz 3 phases 5 wires to the main pannel board, including disconnect means and Digital display unit

7.2.9.6 Inverter Bypass

Provide Inverter Bypass for future installation of a second power source.

7.2.9.7 ACCESSORIES

Provide all accessories, protections and mounting hardware for a complete working system.

7.2.9.8 TESTS, INSPECTIONS, AND VERIFICATIONS

Perform a complete system test including and 8 hour run at full load of the building.

7.2.10 EXECUTION

7.2.10.1 SITE ENVIOROMENTAL PROCEDURES

7.2.10.2 Resource Management:

7.2.10.3 Energy Efficiency:

Verify equipment is properly installed, connected, and adjusted. Verify that equipment is operating as specified.

7.2.10.4 Renewable Energy

Verify proper operation in all modes of system operation by testing. Verify proper operation under a wide range of conditions to verify energy delivery as calculated for those conditions.

7.2.10.5 Solar Energy Systems

Comply with ASTM E1799- Standard Practice for Visual Inspections of Photovoltaic Modules.

7.2.10.6 SERVICES

7.2.10.6.1 Manufacturer's Field Services

Provide Preventive and Corrective maintenance of the system for 2 years after final acceptance of the project, this service will include at least 3 yearly preventive maintenance visits to the site and as many corrective visits as necessary, once informed of a corrective need the contractor will have 48 hours to resolve the e issue.

7.2.10.6.2 Demonstration

Demonstrate system functioning and perform subsequent 2,4 and 8 hours tests at 25%, 50% and 100% of the load.

7.2.10.6.3 Training

Provide training for government personnel for the complete system and each of the components operation and maintenance as well as spare parts.

7.2.10.7 EXTRA MATERIALS

7.2.10.7.1 Extra Materials

Provide Spare Materials to be kept on site to correct common problems that do not need manufacturer's attention.

7.2.10.8 Maintenance Service

Provide 2 years of maintenance service after final acceptance of the project**.**

7.3 Secondary distribution panel boards- Electrical cabling

The Contractor shall supply and install the electrical wiring system, which is required for each panel board and device.

The Contractor shall supply and install the distribution piping system, which shall be made in PVC EB, or EMT according to the location and as per NEC code requirements. The new raceway shall comply with Colombian standard CS 208. The Contractor shall use the same Colombian standard CS208.

The Contractor shall supply and install an underground raceway system according to Colombian standard CS20, PVC EB type, new brand COLMENA or equivalent and shall be certified by RETIE. The underground raceway to be deployed shall come with a safety tape as indicated by Colombian standard CS273. The extremes of the ducts to be installed shall use "terminal de Campana", which shall be located on each junction box. The Contractors shall seal the electrical tubes to avoid the entrance of animals, insects or water and it shall be done according to Colombian standard NTC 2050-305.G.

7.4 Junction boxes for secondary circuit panel boards

The Contractor shall supply and install new junction boxes, which shall be constructed according to Colombian standard CS274.

7.5 Secondary distribution panel boards

The Contractor shall supply and install the new distribution panel boards. The new panel board shall be installed on each new facility. The units to be supplied and installed shall be single- phase type, new brand Legrand, Luminex or RETIE certified, barrages for phase, neutral and ground, insulation voltage up to 600VAC and current interruptive capacity up to 10KA. The circuit capacity for each board is depicted in the drawings. The Contractors shall mark the new panel boards according to Contracting Officer's Representative instructions. Each distribution panel board shall have industrial breaker, thermo- magnetic trigger, and same electrical features as for the ones to be installed in the main electrical circuit board. The drawings indicate the location for each of the new panel board.

Each of the new distribution panel boards (excepting the units for the restrooms) shall have a TVSS unit class B, which shall comply with US standard ANSI/IEEE C62.41-C62.45, interruption capacity up to 80KA, protection modes L-L-L-N, L-G, reject filtering rated > -30dB, response time < 100nSeg, led indicator of status, operational voltage 208VAC/120VAC, three pole system. The Contractor shall supply and install this unit internally or externally. If the unit is external, the metallic enclosure shall be NEMA 2/3, IP 54. The Contractor shall attach in his proposal the NEMA LS-1 format, specifying the equipment's specification to be supplied and installed during project execution.

7.6 Secondary circuit- Electrical wiring
The Contractor shall supply and install the new cabling system for each of the new circuit on the new facilities. The expected wiring shall be type THHN/THWN AWG 3XNo.12.. Drawings indicate the circuits distribution to be supplied and installed by the Contractor.

7.7 Secondary circuit- raceway and ducts
The Contractor shall supply and install PVC EB ducts, caliber ¾ inch, which shall be embedded into wall as showed on drawing E002 and EMT ducts ¾ inch for exposed piping. The raceway for secondary system shall have metallic junction boxes, 0.10 m x 0.10 m each one, which shall be embedded.

7.8 Single-phase receptacle with grounding pin
The Contractor shall supply and install single-phase receptacles duplex type, 120VAC/20A, white color, NEMA 5-20R, which shall be distributed according to drawing E002. The new receptacles to be provided and installed shall be placed 0.40 m over the finished floor level (Excepting those installed in the metallic raceway, see single-phase isolated grounding pin receptacle). The Contractor shall mark the new receptacle according to Contracting Officer's Representative instructions. The new receptacles shall be certified by RETIE.

7.9 Single-phase isolated grounding pin receptacle
The Contractor shall supply and install single-phase receptacles duplex type, 120VAC/20A, NEMA 5-20R, orange color, hospital grade, isolated grounding pin, which shall be distributed according to plan E002. The Contractor shall perform the distribution along the new raceway and location is done only for the administrative and office areas (the installation is not considered for dormitories, restrooms and living/dining and warehouse areas). The new receptacle shall be marked according to Contracting Officer's Representative instructions. The new receptacles shall be certified by RETIE.

7.10 Single receptacle
The Contractor shall supply and install single-phase receptacles single type, 120VAC/20A, NEMA 5-20R, white color, grounding pin, which shall be distributed according to drawing E002. This item is required to connect fluorescent lamps 4X17W exclusively.

7.11 GFCI receptacles 120VAC/15A
The Contractor shall supply and install single phase receptacles duplex type, 120VAC/15A,NEMA 5-15R, GFCI class, which shall be placed on the wet areas such as restrooms, laundry and kitchen. For outdoor areas the Contractor shall supply and install waterproof receptacles and its own outdoor cover. The new receptacles shall include a metallic rectangle box. The Contractor shall install the new receptacles for the restroom 0.20 m. over the sink's surface level, and the units to be installed on the outdoor areas shall be placed 40cm over the finished floor. The new units to be used on the laundry module (washer machines) shall use a duplex receptacles NEMA 5-15R GFCI. The power receptacles to be used by dryers and washer machines shall be placed 1.30 m from finished floor level. The new receptacles shall be certified by RETIE.

7.12 Energy-Saving Bulb
The Contractor shall supply and install the amount of lamps as shown on drawings. The new lamps shall include the electrical access service point (tube type EMT ¾'' for exposed installation or PVC with same caliber if embedded installation, cabling and light switch toggle type), bulb, appliances, and accessories for proper installation. The Contractor shall fix the lamps to the metallic ceiling on each building.. The new light switches to be supplied and install shall be certified by RETIE.

7.13 Decorative lamp ("Turtle" Type appliance)
The Contractor shall supply and install incandescent decorative lamps. The contractor shall submit samples of different possible types of lamps that shall be fitted, so that the US Government shall select the best option. The

Contractor shall install the lamps in hall-ways and facades, as shown on drawings. The new lamps shall have an independent light switch, which shall be installed 0.12 m from finished floor. The Contractor shall include in his/her offer the materials and labor required to install each unit, including the electric plug, socket, piping, cabling and light switch). The electrical ducts shall be embedded into the new building's walls. The lamps shall be placed 0.20 m over the doors' lintel level.

7.14 Grounding system

The Contractor shall supply and install a new grounding system, such as shown on drawing E006. The new system shall be compose of grounding terminals, bared grounding lines and master grounding bar, which the Contractor shall install according to EIA/TIA 607, NTC 2050 and RETIE standards.

The Contractor shall ground the whole electrical network into the new grounding system to be provided and install, in fact all the grounding lines shall be connected into the new Master barrage. The Master barrage shall receive the grounding line that runs from the power substation, secondary distribution panel boards and lightning protection system

The Contractor shall make the new master grounding bar in copper electro-tinned with 15 mm of thickness, 30 cm length and 8 cm width, the new master bus shall have holes, which shall be distanced from each other according to NEMA standard. The Contractor shall install the new master grounding bar into a metallic enclosure, which shall be installed beside the new main distribution panel board . The new metallic enclosure shall be IP 54 and shall have door and lock. The minimum dimensions are as follows: 0.50 m length, 0.20 m height and 0.15 m depth. The Contractor shall mark the grounding lines according to marking chapter included in this specification.

The grounding system shall be composed of grounding electrodes, bared grounding lines AWG 4/0 and inspection boxes. The expected grounding impedance value shall not be higher than 2 ohms. The separation between electrodes and inspection boxes is shown on drawing E006. Each electrode shall include its own inspection concrete box, which shall have a concrete cover. Construction consideration are shown figure No 1.

In case that current soil conditions does not allow obtaining the required impedance value as requested in this specification, the Contractor shall conduct a grounding analysis in order to diagnose the type of soil treatment for being used to improve the expected value of impedance. The contractor shall certify the system by the following specifications:

Impedance value according to IEE 142-4.1.2
Electrodes material NEC 250-52-c (2)
Electrodes size and diameter NEC 250-52-c (3)
Electrodes separation NEC 250-56
Connection quality NEC 250-70
Conductor's gauge network NEC 250-50 (d)
Conductor's gauge for grounding NEC 250-66C
Conductor qualities NEC 250-50
Low power interconnection NEC 250-68
Electrodes accessibility NEC 250-68
Grounding barrage EI/TIA 607-5.4
Flowing current IEEE 1100 table 4.3

The electrodes shall be caliber 5/8'', 2.44 length, copper 99%. The grounding line shall be made in copper AWG No. 4/0. Drawing E007 depicts grounding location.

Note: The electrodes' inspection cavities shall contain a soil treatment such as Favigel or Hidrosolta, in order to improve soil conductivity and homogeneity features.

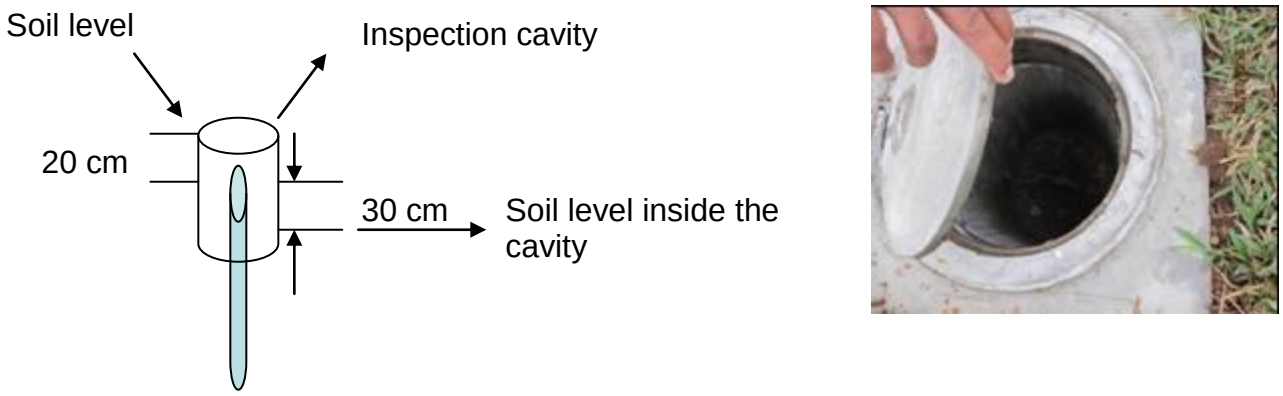

Figure No. 1

7.15 Grounding system for secondary panel boards

The Contractor shall ground the new secondary circuit boards by a line that shall run from the main distribution panel board to be installed and provided by the awarded contractor. The Contractor shall connect the secondary panel board to a master grounding bar, which shall receive all grounding lines. The Contractor shall supply and install secondary grounding bars, which shall be placed on each of the new buildings. The new secondary grounding bars shall connect the grounding line, which runs from master grounding bar from substation and the new secondary panel board. The new secondary grounding bar shall be made in copper, electro tinned and shall include holes, which shall be distanced each one according to NEMA standard. The new barrage shall be placed into a grounding box and it shall have door and electrical isolators. The new grounding barrage shall have the following dimensions: 3 cm width, 15 cm length and 6mm thickness. Each new building shall have a secondary grounding bus.

7.16 Lightning protection

Due to current conditions on the area, construction type, surrounding constructions and forest and the amount of users, which shall inhabit and work on the new buildings, the risk analysis concludes that expected risk factor is rated as 70; in fact such value is considered as HIGH RISK according to Colombian standard NTC 4552. The Contractor shall supply and install a new lightning protection system, which shall be composed by solid electrodes in copper 99.9%, Franklin type, 0,6 m length and caliber 16 mm. The Contractor shall install each air terminal over a top roof base of 0.40 m high. The system shall also have two downpipes, which are done in copper lines AWG No.2/0. The Contractor shall install a lightning system on each new building. The copper ring shall run on the roof and shall be supported by RETIE certified terminals HLC HX 5/16'' X 2 ¼ '' and GAR Burndy 1626. The Contractor shall rigidly install the electrodes on the roof by a threaded terminal drawings depict lightning distribution.

7.17 Marking

The Contractor shall mark the electrical works by means of labels, directories and electrical drawings shall be placed on site. The Contractor shall provide a 10 pounds fire extinguisher according with NFPA regulations, type ABC, including signalling icon and wall marks. After the finishing of the work, the Contractor shall provide As-built drawings including electrical diagrams, wiring gauges, pathways. The Contractor shall include the technical information from each installed device.

7.18 Warranties

The Contractor shall include the preventive, maintenance service, three on-site visits during warranty time (one year).

7.19 Grounding lines' labeling
The Contractor shall mark the grounding lines which are running from the main distribution panel board. These marks shall be done in solid plastic, 5cm x 3cm, fonts colored in red and background colored in yellow.

7.20 Panel board labeling
The Contractor shall mark the main distribution panel board, the breaker on the substation's main panel board, the new distribution panel board for each module (building) and their breakers. All marks shall be done in solid plastic, fonts colored in white and background colored in black. The dimensions shall be as follow:

10 cm x 5cm, for the main distribution panel board
5 cm x 3 cm, for each distribution panel board
5 cm x3 cm, breaker on the substation; main panel board

All panel boards shall have their own single diagram, load diagram and all circuits shall be labeled.

7.21 Junction boxes labeling
The Contractor shall mark the new CS274 junction boxes by using a metallic mark, size 10 cm x10 cm and low relief. The Contractor shall mark the inspection cavities for the grounding system by using a metallic mark, size 5 cm x 5 cm and low relief.

7.22 Metallic enclosures
The Contractor shall label all metallic enclosures by using solid plastic marks, fonts colored in white and background colored in black. The contractor shall also use safety signaling for the panel boards' doors.

7.23 Marking codes
The Contractor shall submit the texts and fonts to be used in the project by the Contractor, in order to get the Contracting Officer's Representative approval.

7.24 Main circuit branch cabling
The Contractor shall label the wiring to be used for phases by colors tapes in yellow, blue and red. Neutral colored in white and grounding in green. The Contractor shall label the main circuit branch by using solid plastic marks, size 10 cm x 5 cm, fonts in white and background in black. The font size shall be selected on site. The Contractor shall place the new labels on the new junction boxes.

7.25 Secondary branch cabling
For cabling gauge bigger than (AWG No4, 2, 1/0, etc) or equal to AWG No. 6, the contractor shall observe the same protocol depicted in the previous item. For cabling gauge such as AWB No. 8, 10 and 12, the contractor shall use colored cabling in red, yellow and blue for each phase (not repeating each others) neutral in white and ground in green. The secondary circuits shall have plastic moorings, holding the cabling every 1.5 meters. The Contractor shall label the secondary branches by solid plastic marks, size 10 cm x 5 cm, fonts in white and background in black. The font size shall be selected on site with the Contracting Officer's Representative. The new labels shall be placed on the new junction boxes.

7.26 Indoor buildings cabling
The contractor shall use colored cabling in red, yellow and blue for each phase (not repeating each others) neutral in white and ground in green. The contractor shall install solid plastic marks on faceplates. The marks shall have the following dimensions 3 cm x 1 cm, fonts colored in white and background colored in black.

8. HYDROSANITARY FACILITIES

8.1 Hydraulic installations

This refers to the supply and installation of pipe work and accessories making up the drinking water network, from the distribution network to bathroom and each kennel of the building, in accordance with the hydraulic drawings, and the work will be done by a specialist technician.
Heavy duty PVC piping and accessories shall be used (RDE 21). Joints will be made with PVC welds, after first cleaning the parts that are to be joined. Piping may not be bent, and all accessories that might be necessary shall be used. All outlets shall be galvanized, with at least 30 centimeters of galvanized piping being left before the end nipple.
All networks will be subjected to pressure tests, in order to check that there are no leaks. All hydraulic intakes shall be protected during construction work with the respective covers, to prevent obstructions.
Pipe work and accessories shall adhere to the corresponding ICONTEC standard, and manufacturers' recommendations shall be followed when handling and during installation.

The Contractor shall complete hydraulic installations as per indicated on drawings. Both inside and outside connectivity must be linked to the main water system installed by the CNP, and control valves. The Contractor shall include the PVC RDE 21 piping, excavation, backfilling, covers, hydraulic tests, etc. The main connection distance is 150 meter approximately. This distance shall be verified by contractor on site. (See attached hydro-sanitary drawings).

Pipework will be buried at a depth of at least 60 cm. from natural ground level. The price of the connection includes the pipework from connection point to the outlet points, the stop cock for each item with the respective cover and key, and the necessary accessories and couplings.

The work will be done according to the manufacturers' instructions in each case, and the standards established in ICONTEC Plumbing Manual 1500 should also be adhered to. Before any pipe is fitted, it should be inspected carefully. The ends of pipes should be kept covered at all times.

The water supply network will be subjected to three 150 psi constant pressure hydraulic tests for a period of not less than 12 hours before final approval is given by the contracting party. The first of these will be before the trench is filled or the pipework covered over, the second after filling, and the third and last one before final handing over of the work.

The pipe shall be dried for 45 minutes before moving the pipe and 48 hours prior to be tested under pressure.

The devices outlets shall be closed with the correspondent cap until the device installation is done.

All materials, piping and accessories shall be submitted to COR for approval.

8.2 Sanitary facilities

This relates to all activities which need to be performed in order to build underground drains in PVC piping, following ICONTEC standards and adhering to the installation procedures established by the manufacturer. The works include positioning, excavation, bed preparation, installation, covering and testing. The work will be done by a specialist technician and shall be in line with the design shown on the plans supplied by the contracting entity.
Networks will be duly embedded in the floors and walls, and/or will be hung from the slabs, depending on the specifications for the respective design, with clamps being used in order to guarantee stability. Pipe ends shall be plugged with PVC caps while sanitary apparatus and grilles are being fitted, and these plugs shall later be removed.

The hydro-sanitary drawing shows the location of the main sewer network. The Contractor shall include the sanitary points from washbasins, shower and toilets leading to an outside box (the necessary boxes are included). The boxes, with their respective covers, will be located as show the drawings and the connection will be made from these to the sewage treatment system. Each box will be built with its respective handle and cover.
The stipulated diameters are 2" for washbasins, floor drains and sink, and 4" for toilets. Drains include grilles (with sosco) and they should be fitted as indicated in the drawings. Pipework should be fitted previously inside the walls.
The outputs for reventilation should have a grid PVC 20 x 20 cm.

2", and 4" PVC piping and accessories will be used for building the drainage network, and manufacturers' standards will be followed with respect to pipework and accessory welds. In the case of piping that will be embedded in concrete slabs, the precautions detailed below will be taken.

1. The gradients of the different branches will be checked once they are in their final position and before the slab is poured.
2. Under no circumstances will gradients of less than 2% be permitted, unless stated otherwise on the plans.
3. Hydraulic tests will be performed by covering pipework outlets with accessories and filling with water up to the level of the top outlet to which the sanitary apparatus will be fitted, then leaving it for six hours, after which there should be no change of level.
4. Inspection plugs will be fitted in places that are accessible; they should have easily-identifiable plastic covers, and remain visible at all times.

Interior drainage facilities will be at individual points, and include the pipework from the outlet point to the nearest box or piping. They will be linked to an existing sewage box.

8.3. Inspection Boxes.
This work consists of building the necessary inspection boxes for the sanitary system (50 x 50 cm.). These boxes will be made of a slab 10 cm. thick and baked brick walls with 1:3 mortar. The walls will be plastered inside with waterproofed 1:3 plaster 2.5 cm. thick. The 10 cm. thick slab will be made of 2500 psi concrete with 420 Mpa reinforcement ½" thick every 0.15m. running in both directions, on a layer of filling material 20 cm. thick which has been compacted to 95% of the laboratory density. The box lid should be of 21 Mpa concrete with 420 Mpa reinforcement ½" thick every 0.15m. running in both directions.

8.4 Sewer treatment system
This work consists in the supply and installation of one sewer treatment system type COLOMBIT or equivalent.
The installation of the sewer treatment system shall be installed according to procedures established by the manufacturer. The works include positioning, excavation, site preparation, installation, covering and testing. The work shall be done by a specialist technician.

8.5 Sanitary Apparatus
The Contractor shall include the sanitary apparatus that are shown on the attached hydro-sanitary drawings:

- The sink shall be made on site in concrete with electro welded mesh and polished granite finish. Includes water tank, faucet and grill with fitting.

9. METAL CARPENTRY

9.1 Door and doorframe (P-1 / P-2 / P-5).

The Contractor shall supply and install a door and doorframe made out of natural anodized aluminum. The door panel will be formed by a 0.11m aluminium frame and crosspiece at lock height. Louver-type aluminum for door lower and upper panels and transom. All with fiberglass mosquito screen protection towards the inside. Hardware: entrance lock: Schlage Orbit matte chromo or equivalent, 4 hinges and a stop. Door measurements as indicated on drawing A-3. Door swing as shown on the architectural drawings. The space along the frame and the masonry wall shall be filled with 21 Mpa (3000 PSI) concrete in order to guarantee the stability of the frame

9.2 Windows (V-1)
The Contractor shall install the windows as shown on the architectural drawings. The frames shall be made of natural anodized aluminum with transparent 4 mm thick glass and transom in louver-type aluminum. Sliding type windows, with handle and well-fitted fiberglass mosquito screen (including louver area). The Contractor shall also include the windowsill with its dropper in aluminum. Dimensions and location as shown on the attached architectural drawings **A-3**. The space along the frame and the masonry wall shall be filled with 21 Mpa (3000 PSI) concrete in order to guarantee the stability of the frame.

9.3 Louver-type aluminium grill and frame with mosquito screen (R-1 /R-2)
The Contractor shall supply and install a louver- type color natural anodized aluminum window as shown on the attached architectural drawings. The Contractor shall install this according to dimensions shown on the drawing, with the grill of profile ALN 315 with frame in aluminum balance profile heavy duty type series M-3831 natural color. The Contractor shall include all fixtures required for proper functioning of the window and fiberglass mosquito screen. The space along the frame and the masonry wall shall be filled with 21 Mpa (3000 PSI) concrete in order to guarantee the stability of the frame.

9.4 Chain Mesh Fencing for Kennels and Access Door (P-4). The fencing that is to be installed shall be highly resistant to oxidation, in a galvanised wire gauge 10, PVC coated and with a UV protector. Chain mesh 1½" by 1½". The mesh will be bordered by the 1½" x 1/8" platen on each of the four sides. The posts supporting the mesh will be galvanized pipe 2" in diameter and 2.00 metres high, placed equidistantly as shown on architectural drawings. The mesh fencing includes an access door (P-4). Towards the exterior, the door must include a floorbolt, bolt padlock fitting, padlock with three keys. Dimensions as shown on the architectural drawings. The space along the frame and the masonry wall shall be filled with 21 Mpa (3000 PSI) concrete in order to guarantee the stability of the frame.

9.5 Chain Mesh Window and Door (P-3). This item includes the supply and installation of a window and door (including floor bolt, bolt padlock fitting and padlock with three keys). The window enclosure shall be highly resistant to oxidation, in a galvanised wire gauge 10, PVC coated and with a UV protector. Chain mesh 1½" by 1½". The mesh will be bordered by the 1½" x 1/8" platen on each of the four sides. It must also include fiber glass mosquito netting as specified on item **10.1**. Towards the exterior, the chain door must include a floor bolt, padlock fitting, padlock and three keys. Dimensions as shown on the architectural drawings. The space along the frame and the masonry wall shall be filled with 21 Mpa (3000 PSI) concrete in order to guarantee the stability of the frame.

9.6. Floor Metal Grille. This item includes the supply and installation of two metal floor grilles with a 1½" x 3/16" angle iron structure and platens measuring 1½" x 3/16". Dimensions: as per indicated on drawings. To be installed above the drainage pit, in front of the kennels. The grille should withstand a load of 1.5 Kg/cm2. This item includes installation of metal angles around the edges of the pit to support the grille and prevent the concrete slab from being chipped or getting damaged. The item also includes painting the grille with anti-corrosive paint and two coats of paint for metal and outdoor use.

Metalwork will include installing all complementary items and the necessary accessories for ensuring correct operation, anti-corrosive paint and two coats of paint for highly-aggressive atmospheric conditions (for any item like grilles, meshes, etc.).

Eating Bowls. This item includes the supply and installation of two (2) aluminium bowls each Ø 0.20 to 0.22m. and 0.065. to 0.08m deep in each kennel, embedded in concrete pedestals (Pedestals height: 0.25m and 0.125m). The contractor should guarantee that the bowls may be removed by human beings but that its adjustment to the pedestal will not be removed by the dogs. This item includes the aluminium bowls (24).

10. GLASS AND MOSQUITO NETTING

10.1 Glasses

The Contractor shall supply and install a 6 mm thick glass in appropriate conditions, including all fixtures required for perfect functioning.

10.1 Fiber Glass Mosquito Netting: This item includes the supply and installation of fiberglass mosquito 18 x 16 mesh, including all fixtures required for perfect installation and functioning. Refer to the architectural drawings and this specifications.

11. Other Requirements:

11.1 Implement temporary license for Project Management Software The Contractor shall buy and implement a temporary license for a Project Management software called Primavera in order for the Project management system for the project is compatible with the software that the INL construction team uses to manage INL projects. The contractor shall buy and implement the licenses for P6 Enterprise Project Portfolio Management (P6 EPPM) and for Primavera Contract Management & Business Intelligence Publisher Edition (CM). The contractor shall not include the training for the software

11.2 List of Personnel: Prior to initiation of the work, a list of personnel to be employed at the site shall be submitted for review to be able to obtain access to work area, including full names, identification card numbers, place and date of birth, home address and, in some cases, a government valid certificate of good conduct and photographs. The US Government and the CNP shall reserve the right to admit or withdraw personnel from the work site for reasons of security and/or due to the quality of the work.

11.3 Vehicles and Machinery: All vehicles and machinery or equipment that will be scheduled to enter the work area shall be itemized on a list, submitted well enough in advance to be verified and to obtain an entry permit. This list shall include type of vehicle, plates, complete name and ID number and place of issue of the driver. The contractor shall take into account the time used by vehicles and personnel in order to enter and exit the work area.

11.4 **Industrial Safety Person:** The contractor shall have permanently on site a specialized person in industrial security that will be dedicated to foresee that the workers are constantly complying with the security standards of personnel and equipment, scaffolds and other installations or structures.

11.5 Apparel: All personnel shall be equipped with an overall of the same design and color, or long pants and T-shirt with sleeves of the same type and color, boots, hardhats, gloves and any security elements required for their particular activity, such as face masks or shields, gloves, boots, ear plugs, etc. Use of these items at the work site is mandatory. Likewise, each employee shall wear a laminated recent photo identity card indicating his/her name and identification card number, position, and contractor name.

11.6 Cleaning and Debris Removal: The contractor shall keep personnel cleaning the construction site and nearby zones daily. The unit prices for all items, without exception, include the costs of cleaning up, loading and removal of all materials resulting from the building work. The contractor will take these materials to an authorized dump, where the interests of the base, third parties and the environment will not be affected (the contractor shall follow the parameters established in Resolution

541/94 and the subsequent that modify it). Material from excavations shall be deposited in such a way as to avoid blocking the entrance to the site at all times or occupying public roads while the material is being loaded into trucks for removal.

11.7 Materials and Finishes: The contractor shall include new materials and of first quality design for extended use and heavy duty. The contractor shall assure good materials and excellent finishes. All the colors and finishes shall be submitted to the COR for approval prior to purchase and installation. The contractor shall leave on site a stock of materials like ceramic tiles, terminals or pipes that have been fitted, representing three (3) % of the total quantity, for future maintenance purposes. These items shall be handed over duly packed, identified and listed.

11.8 Food, Transportation and Lodging: The contractor is responsible for food and lodging for personnel off the Police Facilities.

11.9 Information of Important Events: The contractor shall inform the Contracting Officer's Representative of special events or works, such as the pouring of concrete, tests and the like, giving the Contracting Officer's Representative at least seventy two (72) hours notice so he/she can be physically present.

11.10 Site Description: The contractor before beginning preliminary works shall complete a site description with photographs and an account of the actual conditions of roads, sidewalks, surrounding buildings, etc., this report shall be signed by the commander and contractor. This report is for the purpose documenting the actual status of the area before the work is performed. This report will be used to compare the site after the work is finished. Three identical copies must be furnished: one for the user (Colombian National Police), one for the contractor, and the other one for the US Government. If the Contractor caused any damage to the work site or other private or public property he/she shall do all the repairs prior to the contract closeout; these repairs are without cost to the US Government. At the end of the projects a closing review and memorandum should be done with the participants, a signed copy shall be furnished in the final report.

11.11 Inventory of Removed Elements: The contractor shall dismount, list, and submit the reusable elements of the work site to the final user (Colombian National Police). A signed copy of this list shall be given to the user and the Contracting Officer's Representative.

11.12 Protection of Elements in the Work Area: Areas, equipment, and elements at the work site or in areas nearby shall be protected from damage or deterioration. The contractor shall assume the cost of any repair or replacement required because of improper use or carelessness on his part or on the part of his workers.

11.13 Security of the Construction Site: The Contractor shall supply the services of security of the construction site and the camps. The US Government and the final user will not be responsible for the payment of the security services nor for the elements left at the construction site.

11.14 Nearby Zones: The nearby zones must be left in the same conditions previous to the construction or in better conditions (with grass, gravel, sidewalk, floor finishes or whatever applies in each case). Furthermore, repairs shall be done to faults, scratches, damage and anything else which the contractor and the US Government might note in the building and neighboring constructions for ensuring that the work is made ready and handed over correctly. The contractor shall disassemble and remove all preliminary facilities, camps, sites, etc. before the final handover, eliminating all debris and extra materials.

11.15 Underground Interferences Study: The contractor shall have on hand a study of all aerial, surface, underground or engaged interferences provided by the CNP, so as not to damage pipes, boxes, wiring, posts, hoses, wells or other elements or structures existing in the work area or adjacent to it. Should the excavation interfere with sewers or pipes, the contractor shall build adequate support or protection for these installations and/or develop a new route, subject to prior approval by the Contracting Officer's Representative. The contractor shall keep all drains caps and catch pits clear in public utility networks near excavation sites to prevent their obstruction or damage.